

# **POLAR PRESS**

by Subzero Engineering

## **ENVIRONMENTAL MONITORING**

Your Data Center Name

## Health Check

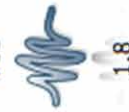
QTY GOOD ALERTS

|  |   |   |   |
|--|---|---|---|
|  | 8 | 6 | 2 |
|  | 3 | 3 | 0 |
|  | 2 | 2 | 0 |
|  | 1 | 1 | 0 |
|  | 1 | 1 | 0 |
|  | 2 | 2 | 0 |
|  | 1 | 1 | 0 |

LOCAL TEMP



PUE



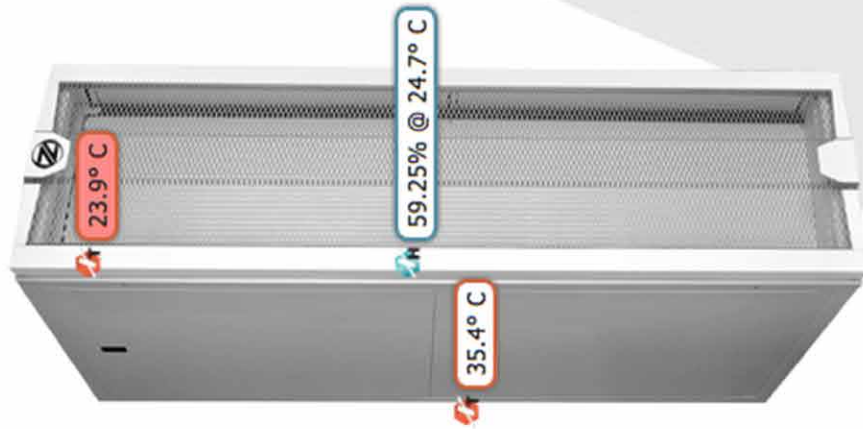
RCI HIGH



[Edit](#) | [Delete](#)

[Move Group](#)

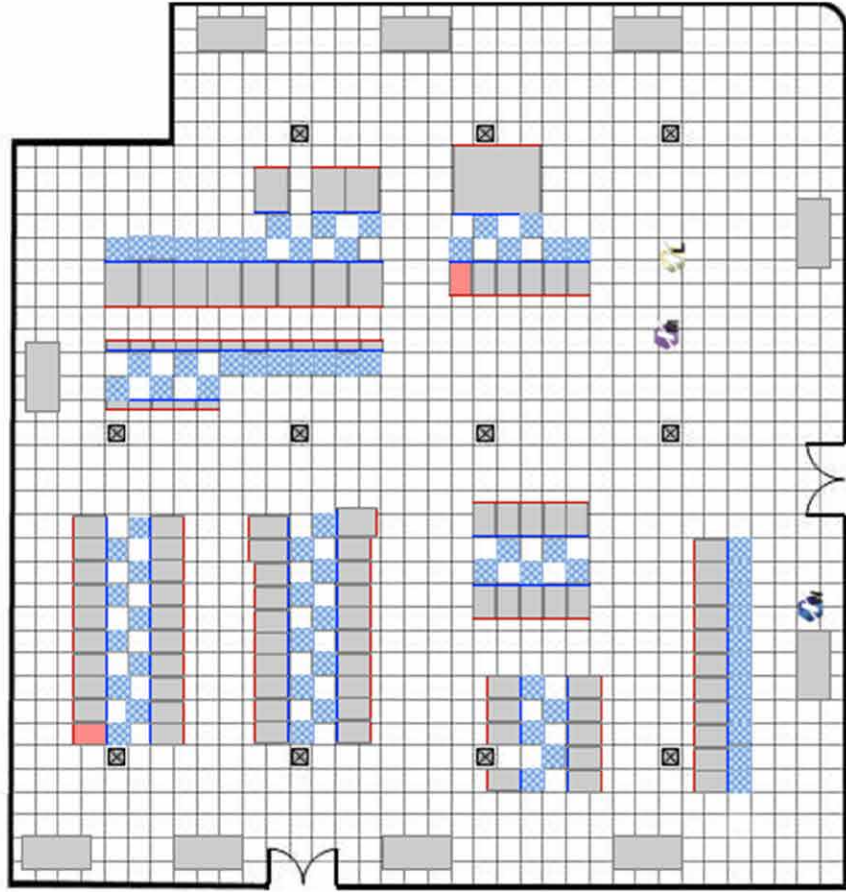
RCI LOW



Server Rack: G4

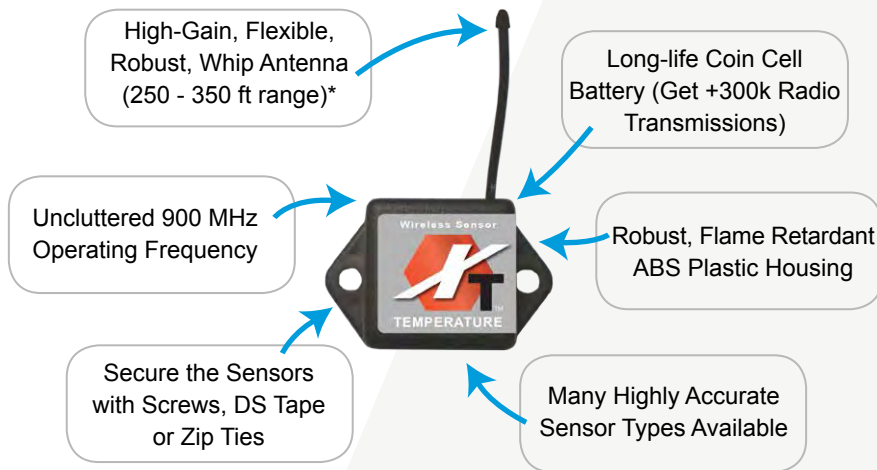
[Upload New Floorplan](#)

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## Wireless Sensor: Low Cost, Reliable And Ready to Use

### BIG FEATURES IN A SMALL PACKAGE!



### WIRELESS SENSOR FEATURES

- FCC/CE Certified Wireless Radio Technology
- Operating Frequencies (25 Channels)
  - 900 MHz (North America, South America and New Zealand)
  - 868 MHz (Europe, Middle East and Africa)
  - 433 MHz (Asia Pacific)
- 250 - 350 ft. Device Range\*
- Optimized Power Management for Long Battery Life
  - 0.5  $\mu$ A - Sleep Mode
  - 35 mA - Tx Current

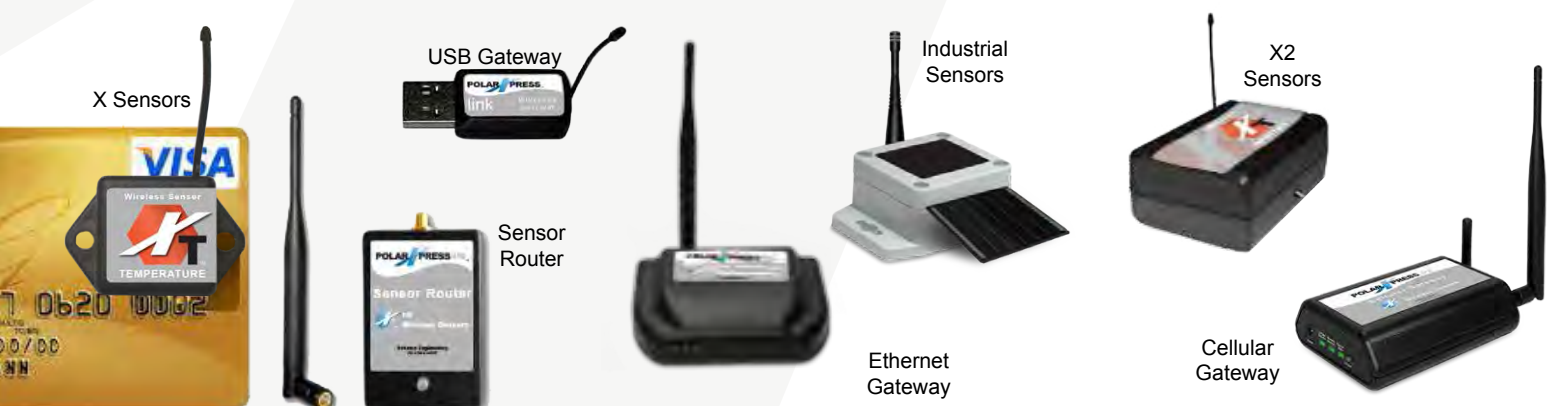
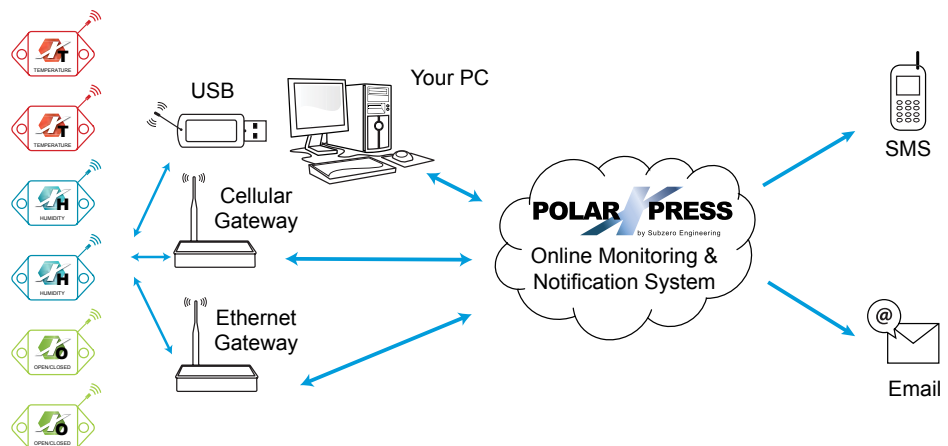
\* Actual range may vary depending on environment.

### THE POLARXPRESS WIRELESS SENSOR NETWORK

Wireless Sensors detect the incidents you wish to monitor.

Wireless Gateways transmit data between your local sensor network and the PolarXpress online wireless sensor monitoring service.

The PolarXpress online portal allows for user customization of your sensor network, and can notify and alert you of sensor events.





## PolarXpress Link Ethernet Gateway

### GENERAL DESCRIPTION

The PolarXpress Link Ethernet gateway allows your PolarXpress X Wireless Sensors to communicate with the PolarXpress Online Wireless Sensor Monitoring and Notification System without the need for a PC. Simply plug this device into any open network port with internet connection and it will automatically connect with our servers. This is the perfect solution for locations where there is an active internet connection.

With the graphical PolarXpress software, you can easily configure your network, view collected sensor data and set alarms through SMS or email, all from any web enabled browser. The system allows for complete configuration and customization at a sensor, local network, or client wide level.

PolarXpress' Ethernet gateway is specifically designed to respond to the increasing market need for global technology that accommodates a variety of vertical M2M application segments and remote wireless sensor management solutions.

The gateway is available in global frequencies of 900, 868 or 433MHz. Enjoy reliable, low cost, wireless monitoring of your facilities or specific applications, with PolarXpress wireless sensor networks.

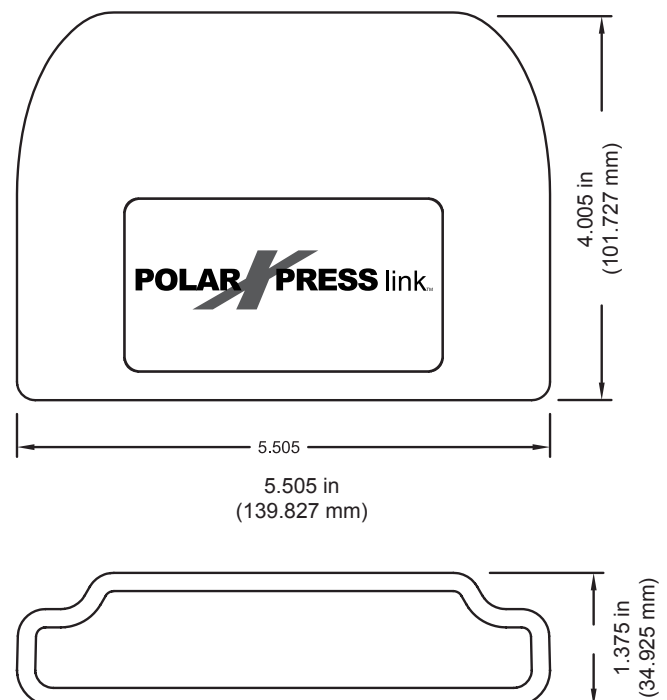
### APPLICATIONS

- PolarXpress Sensor Monitoring



### POLARXPRESS X SENSOR CORE SPECIFICATIONS

- Supports multiple RF technologies including 900, 868 and 433MHz sensor solutions
- Plug & Sense, no hassle set-up
- No PC required for operation
- Remote software upgrade capability
- Local status LEDs with transmission and online status indicators
- Online heart-beat control
- Power outage notification
- AC power supply or Power-Over-Ethernet



## POLARXPRESS ETHERNET GATEWAY SPECIFICATIONS

|                           |   |
|---------------------------|---|
| <b>Ethernet</b>           |   |
| Ethernet Types:           | Standard, POE   |
| Antenna:                  | Connector: SMA<br>Gain (dBi):5.0                                |
| Hardware:                 | 10/100 Ethernet Controller                                      |
| IEEE Standard Compliance: | 802.3-2002  |
| Operation:                | Full and Half-Duplex  |
| Cross-Over Correction:    | Automatic MDI/MDI-X   |
| Addressing:               | Pre-programmed MAC Address                                      |
| Host Address:             |   |
| Default Port:             | 3000  |
| Protocols Supported:      | UDP, DHCP, TCP  |
| Cable Connector:          | Cat 5   |
| Memory Capacity:          | 40,000 messages   |
| <b>Power</b>              |   |
| Power Supply:             | 5.5 V AC adapter or<br>5.5 V Power-Over-Ethernet adapter        |
| <b>Mechanical</b>         |   |
| LEDs                      | H/W status, PolarXpress connection status, sensor data activity |
| Enclosure                 | ABS plastic   |
| Dimensions                | 139.85 x 101.75 x 34.95 mm                                      |
| Weight                    | 12.6 ounces   |
| <b>Environmental</b>      |   |
| Operating Temperature     | -40°C to +85°C  |
| FCC Approval:             | ZTL-RFSC1   |



Managing What Matters

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## PolarXpress Link USB Gateway

### GENERAL DESCRIPTION

The PolarXpress Link USB Gateway allows your PolarXpress X Wireless Sensors to communicate with PolarXpress Online Wireless Sensor Monitoring and Notification System. Simply install the USB driver and plug the device into an available USB port on a Microsoft Windows PC.

If the PC has an active internet connection and you wish to use it with the PolarXpress online software, install the PolarXpress Gateway application to pass sensor data to the online system. The PolarXpress software allows you to export sensor data in a .csv format spreadsheet, and is also capable of sending SMS text and email alerts if the host computer has an active internet connection.

With the online PolarXpress software, you can easily configure your network, view collected sensor data and set alarms through SMS or email, all from any web enabled browser. The system allows for complete configuration and customization at a sensor, local network, or client wide level.

PolarXpress' USB gateway is specifically designed to respond to the increasing market need for global technology that accommodates a variety of vertical M2M application segments and remote wireless sensor management solutions.

The gateway is available in global frequencies of 900, 868 or 433MHz. Enjoy reliable, low cost, wireless monitoring of your facilities or specific applications, with PolarXpress wireless sensor networks.

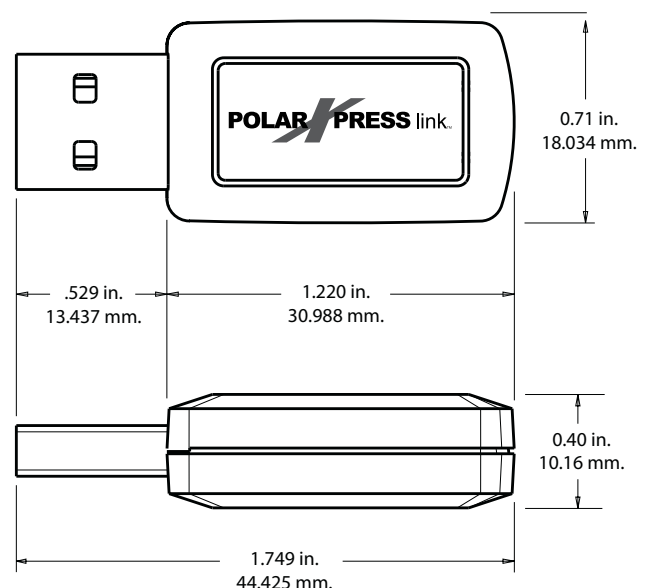
### APPLICATIONS

- PolarXpress Sensor Monitoring



### POLARXPRESS LINK USB GATEWAY FEATURES

- Supports multiple RF technologies including 900, 868 and 433MHz sensor solutions.
- Uses host PC for power.
- Can be used with PolarXpress Online Software.
- Programmable heart-beat control.
- Supports up to 100 wireless sensors per USB.
- Windows 7, Vista and XP compatible.



## POLARXPRESS USB GATEWAY SPECIFICATIONS

|                                  |  |
|----------------------------------|--|
| <b>USB</b>                       |  |
| Type:                            | USB 2.0 Full Speed Bus Standard        |
| Display Name:                    | Wireless Sensor Gateway Status         |
| Display Type:                    |  |
| Version:                         | 1.0.3.0                                |
| Software Compatible Platforms:   | Microsoft Windows XP, Vista, Windows 7 |
| Bus Reported Device Description: | M+ LINK                                |
| Memory Capacity:                 | 40,000 messages                        |
| <b>Power</b>                     |  |
| Maximum Power Required:          | Powered through USB output of PC       |
|                                  | 50 mA                                  |
| <b>Mechanical</b>                |  |
| Enclosure                        | ABS plastic                            |
| Dimensions                       | 1.75 x 0.71 x 0.40 inches              |
| Weight                           | 0.36 ounces                            |
| <b>Environmental</b>             |  |
| Operating Temperature            | -40°C to +85°C                         |
| FCC Approval:                    | ZTL-RFSC1                              |



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## PolarXpress Link Cellular Gateway

### GENERAL DESCRIPTION

Don't have an existing network connection where you need it most? The PolarXpress Cellular Gateway allows your PolarXpress Wireless Sensors to communicate with the PolarXpress Online Wireless Sensor Monitoring and Notification System via cellular transmission. This is the perfect solution for remote locations, or where an existing internet connection is not an option.

Our cellular gateway is an advanced all wireless M2M gateway that enables fast time-to-market solutions for a wide range of M2M applications.

The PolarXpress Cellular Gateway is based on the latest Dual-band CDMA wireless engine and comes integrated with PolarXpress wireless access point network (WAN) for use with all PolarXpress sensors.

PolarXpress' cellular gateway is specifically designed to respond to the increasing market need for global technology that accommodates a variety of vertical M2M application segments and remote wireless sensor management solutions.



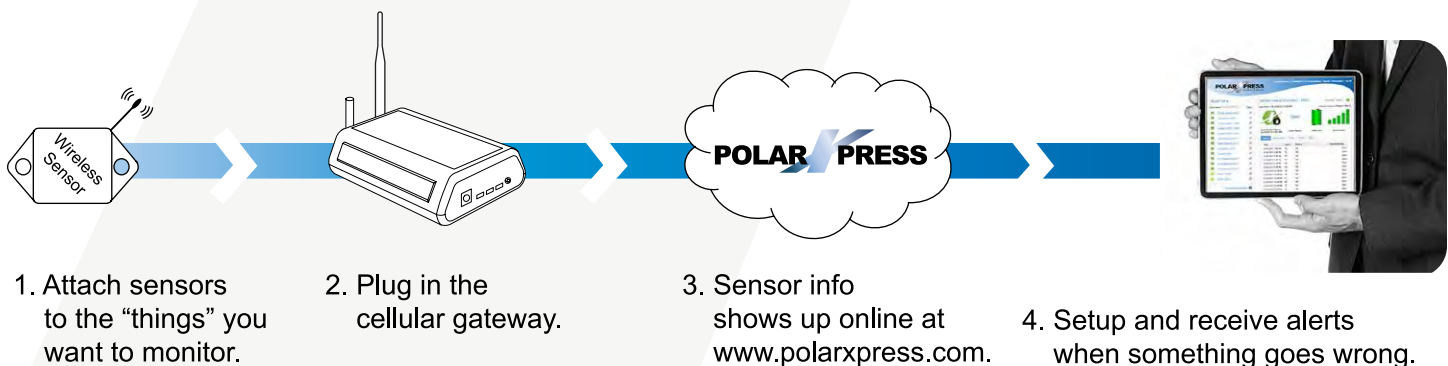
### POLARXPRESS CELLULAR GATEWAY FEATURES

- Supports multiple RF technologies including 900, 868 and 433MHz sensor solutions
- True plug & play, no hassles for internet configuration set-up
- No PC required for operation
- Low-cost cellular service packages
- Remote software upgrade capability
- Local status LEDs with transmission and online status indicators
- Watchdog function and online heart-beat control
- AC power supply
- Dual Band CDMA (850/1900 MHz)

### APPLICATIONS

- PolarXpress Sensor Monitoring Without Internet Connection

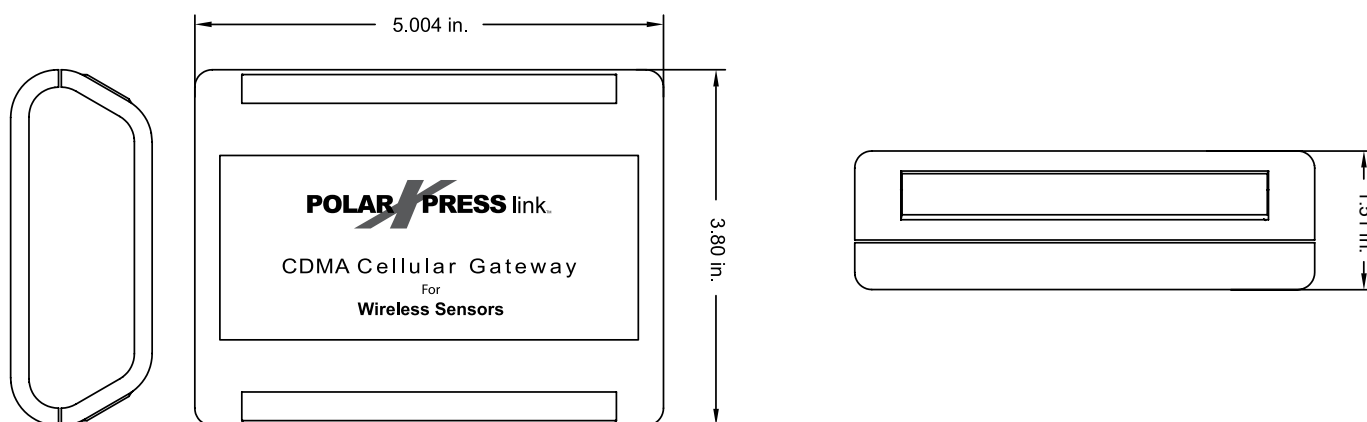
### HOW IT WORKS





## POLARXPRESS CELLULAR GATEWAY SPECIFICATIONS

|                       |   |
|-----------------------|---|
| <b>Cellular</b>       |   |
| CDMA                  | Dual Band CDMA<br>Frequency Range: 800 / 1900 MHz                 |
| Antenna               | Connector: SMA<br>Gain (dBi): 1.5                                 |
| <b>Power</b>          |   |
| Input Power           | 5.5 VDC @ 900 mA  |
| <b>Mechanical</b>     |   |
| LEDs                  | Cellular Status LED, Online Status LED, Sensor Network Status LED |
| Enclosure             | ABS   |
| Dimensions            | 5.004 x 3.8 x 1.51 in.  |
| Weight                | 7 ounces  |
| <b>Environmental</b>  |   |
| Operating Temperature | -30 to +70°C  |
| Storage Temperature   | -40°C to +85°C  |



## PolarXpress Link Sensor Router

### GENERAL DESCRIPTION

PolarXpress Routers allow you to extend the coverage area (range) of your wireless sensor network by repeating the signals between your wireless sensors and the wireless gateway.

### GENERAL DESCRIPTION

On power up, the router will locate a gateway that has the “best” wireless signal available. The router then auto-configures itself to communicate and link with this gateway. After linking with the parent gateway, the router then establishes itself as a sub-network with it's own dedicated channel to the gateway, relieving congestion from multi-sensor networks.

As data is generated in the router's sub-network, it will intelligently store and forward this information to its parent gateway. This conserves battery power on the wireless sensors, increases network reliability, and intelligently manages network traffic to avoid cluttering.

When a PolarXpress wireless sensor is locating a network, it will search for the “best” wireless signal. If the best signal is a router, the sensor will auto-configure itself to link with the router (no user intervention required). A router will permit a wireless sensor to link if one of the following conditions is met:

- The router already knows the wireless sensor and permits linking.
- The router confirms the wireless sensor's permissions from its parent gateway.

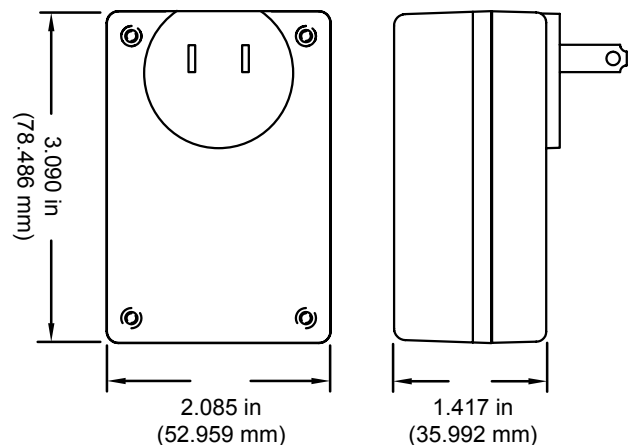
### APPLICATIONS

- Extend the Coverage Area of Your Wireless Sensor Network



### MONNIT WIRELESS ROUTER FEATURES

- Extends the coverage area of your wireless sensor network.
- Supports 6 messages / minute.
- Built in memory can queue up to 14,000 messages for delivery to the gateway.
- AC powered, so no batteries needed.



## POLARXPRESS SENSOR ROUTER SPECIFICATIONS

|                                      |  |
|--------------------------------------|--|
| <b>Power</b>                         |  |
| Standard Operating Range             | 100-240 VAC  |
| Max Operating Range                  | 90-264 VAC   |
| Input Frequency                      | 50/60Hz +/- 3Hz  |
| Max Power Consumption                | 1.0W   |
| <b>Wireless Operation</b>            |  |
|                                      | Up to 100 Total Wireless Devices Per Gateway   |
| Maximum Wireless Devices Per Gateway | Up to 99 Wireless Sensors (Router counts as wireless device)   |
| Maximum Sensors Per Router           | 14,000 Messages  |
| Message Storage / Memory             | Up to 6 Messages Per Minute  |
| Recommended Network Communications   | Up to 30 Seconds   |
| Router Communication Delay           | (At number of recommended network communications)  |
| <b>Mechanical</b>                    |  |
| LEDs                                 | Single LED H/W Status / Activity<br>- Flashing Red/Green (router is looking for an APN to join)<br>- Solid Red (no network found)<br>- Solid Green (router has joined a network)<br>- Flashing Green (sensor data is intercepted and repeated) |
| Enclosure                            | ABS Plastic<br>UL94V-0 Flame Rating  |
| Dimesions                            | 3.09 x 2.085 x 1.417 in.<br>(78.486 x 52.959 x 35.992 mm)  |
| Weight                               | 4.5 ounces   |
| <b>Environmental</b>                 |  |
| Operating Temperature                | -40° to +85° C (-40° to +185° F)   |
| FCC Approval:                        | ZTL-RFSC1  |



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## PolarXpress XH Sensor

### High Accuracy Wireless Humidity (RH) Sensor

#### GENERAL DESCRIPTION

The High Accuracy (HA) Wireless Humidity (RH) Sensor allows you to accurately monitor the relative humidity of the air within a room or enclosure. It also can record and chart the temperature value.

#### FEATURES

- Measures relative humidity with high accuracy.
- Measures temperature in Celsius and Fahrenheit.
- PolarXpress online wireless sensor monitoring and notification system to configure sensors, view data and set alerts via SMS text and email.

#### PRINCIPLE OF OPERATION

The PolarXpress High Accuracy Wireless Humidity (RH) Sensor measures the relative humidity at the device. The sensor returns RH and temperature values to the PolarXpress Online Sensor Monitoring and Notification System. The system calculates dew point from the data and stores all three data points in the online system where the data can be reviewed and exported as a data sheet or graph. Notifications can be set up through the online system to alert the user when defined thresholds have been met or exceeded.

#### POWER OPTIONS

X Sensors are powered by a replaceable 3.0 V coin cell battery. The X2 Sensors are larger in size (3" [L] x 2.1" [W] x 1.2" [h]) and include two long-life AA batteries.

It is recommended that unless you are using the AA battery solution, you set heartbeat to no faster than one hour to preserve battery life.

#### APPLICATIONS

- Cabinet Humidity Monitoring
- Ambient Humidity Monitoring



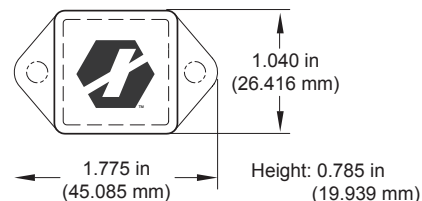
#### POLARXPRESS X SENSOR CORE SPECIFICATIONS

- Power: X Sensor: replaceable 3.0 V coin cell battery.  
X2 Sensor: 2 replaceable AA 1.5V batteries.
- Communication: RF 900, 868 and 433 MHz
- Antenna: 4" wire antenna
- Operating Temperature: -20° to 60°C (-4° to 140°F)
- Device Range: 250 - 300 ft. non-line-of-sight\*
- Battery Life:  
X Sensor: At 1 hour heartbeat setting, coin cell battery will last 1-2 years.\*\*  
X2 Sensor: At 1 hour heartbeat setting, included AA batteries will last more than 4 years.\*\*

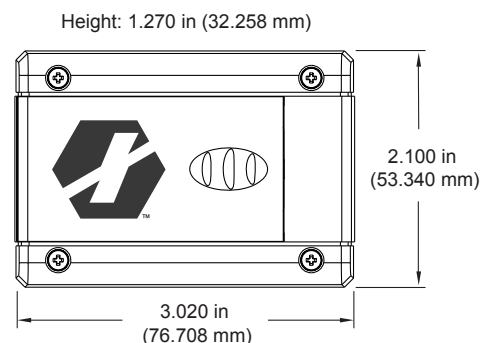
\* Actual range may vary depending on environment.

\*\* Battery life is determined by sensor reporting frequency and other variables.

X Sensor



X2 Sensor



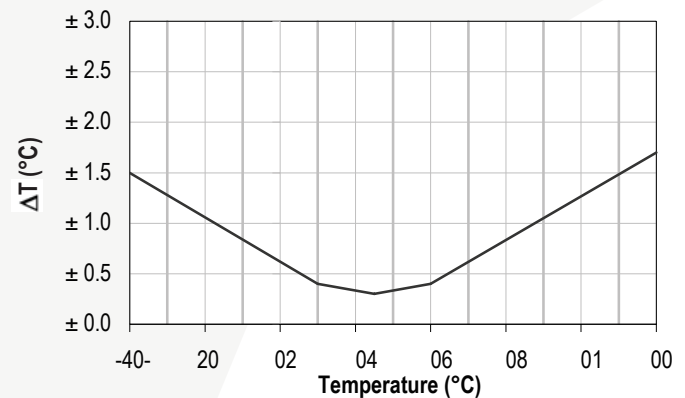
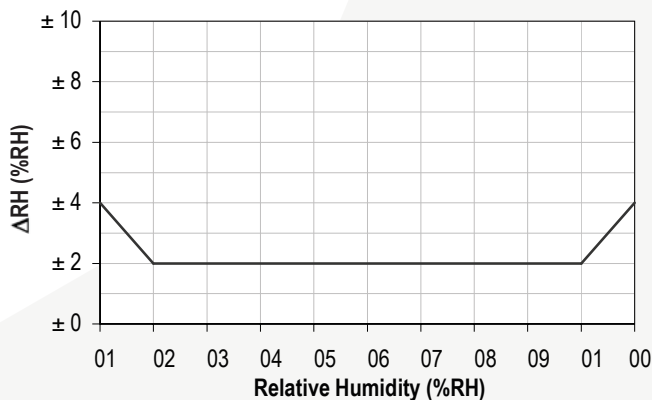


## TECHNICAL SPECIFICATIONS

|   |   |
|---|---|
| Supply Voltage  | 2.0 - 3.6 VDC*  |
| Current Consumption                                       | 0.7 $\mu$ A (sleep mode)<br>2 mA (radio idle/off mode)<br>2 mA (measurement mode)<br>25 mA (radio RX mode)<br>35 mA (radio TX mode) |
| Operating Temperature Range (Board Circuitry and Battery) | -20°C to +60°C (-4°F to +140°F)**   |
| Optimal Battery Temperature Range (Coin Cell)             | +10°C to +50°C (+50°F to +122°F)  |
| Accuracy  | +/- 2% under normal conditions (10% - 90% RH)   |
| RH Operating Range  | 0 - 100% RH   |
| RH Response Time  | 8 sec (tau 63%)   |

\* Hardware can not withstand negative voltage. Please take care when connecting a power device.

\*\* At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.



## CAUTION/NOTICE:

This product is designed for application in an ordinary environment (normal room temperature, humidity and atmospheric pressure). Do not use this sensor under the following conditions as these factors can deteriorate the product characteristics and cause failures and burn-out.

- Corrosive gas or de-oxidizing gas - (chlorine gas, hydrogen sulfide gas, ammonia gas, sulfuric acid gas, nitric oxides gas, etc.).
- Volatile or flammable gas.
- Dusty conditions.
- Under low or high pressure.
- Wet or excessively humid locations.
- Places with salt water, oils, chemical liquids, or organic solvents.
- Where there are excessively strong vibrations.
- Other places where similar hazardous conditions exist.

Use this product within the specified temperature range. Higher temperature may cause deterioration of the characteristics or the material quality of this product.



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## PolarXpress XT Sensor

### Wireless Temperature Sensor

#### GENERAL DESCRIPTION

The RF Wireless Temperature Sensor uses a type NTC thermistor to measure temperature.

#### FEATURES

- Accurate to  $\pm 1^{\circ}\text{C}$  ( $\pm 1.8^{\circ}\text{F}$ )
- Increased accuracy by user calibration to  $\pm 0.25^{\circ}\text{C}$  ( $\pm 0.45^{\circ}\text{F}$ )
- PolarXpress online wireless sensor monitoring and notification system to configure sensors, view data and set alerts via SMS text and email.

#### PRINCIPLE OF OPERATION

The PolarXpress Wireless Temperature Sensor outputs the ambient temperature in degrees Fahrenheit. It is programmed to sleep for a user-given time interval (heartbeat) and then wakeup, send power to the NT Thermistor and wait for it to stabilize, and convert the analog data, mathematically compute the temperature and transmit the data to the gateway. To stay within the abilities of the processor, the temperature is computed off a data table provided by the manufacturer. To reduce error, a variable resistor configuration is implemented over specified temperature ranges.

#### POWER OPTIONS

X Sensors are powered by a replaceable 3.0 V coin cell battery. The X2 Sensors are larger in size (3" [L] x 2.1" [W] x 1.2" [h]) and include two long-life AA batteries.

It is recommended that unless you are using the AA battery solution, you set heartbeat to no faster than one hour to preserve battery life.

#### APPLICATIONS

- Cabinet Temperature Monitoring
- Return Air Temperature Monitoring
- Supply Air Temperature Monitoring



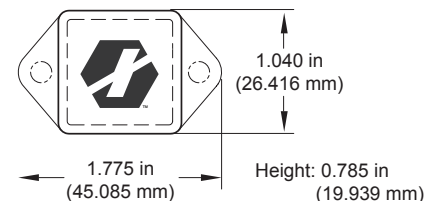
#### POLARXPRESS X SENSOR CORE SPECIFICATIONS

- Power: X Sensor: replaceable 3.0 V coin cell battery.  
X2 Sensor: 2 replaceable AA 1.5V batteries.
- Communication: RF 900, 868 and 433 MHz
- Antenna: 4" wire antenna
- Operating Temperature:  $-20^{\circ}$  to  $60^{\circ}\text{C}$  ( $-4^{\circ}$  to  $140^{\circ}\text{F}$ )
- Device Range: 250 - 300 ft. non-line-of-sight\*
- External Probe: X2 Sensors come with External Probe Leads. (Available in custom lengths.)
- Battery Life:  
X Sensor: At 1 hour heartbeat setting, coin cell battery will last 1-2 years.\*\*  
X2 Sensor: At 1 hour heartbeat setting, included AA batteries will last more than 4 years.\*\*

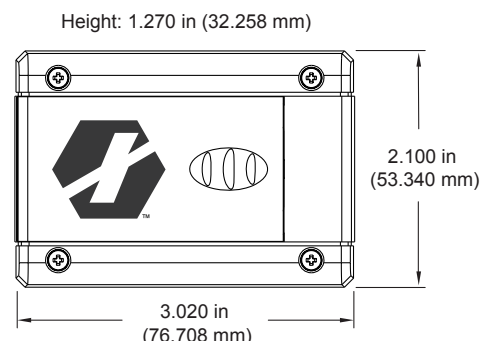
\* Actual range may vary depending on environment.

\*\* Battery life is determined by sensor reporting frequency and other variables.

X Sensor



X2 Sensor



## TECHNICAL SPECIFICATIONS

|   |   |
|---|---|
| Supply Voltage  | 2.0 - 3.6 VDC*  |
| Current Consumption   | 0.7 $\mu$ A (sleep mode)<br>2 mA (radio idle/off mode)<br>2 mA (measurement mode)<br>25 mA (radio RX mode)<br>35 mA (radio TX mode)                         |
| Operating Temperature Range (Board Circuitry and Battery)       | -20°C to +60°C (-4°F to +140°F)**   |
| Optimal Battery Temperature Range (Thermistor Only)             | +10°C to +50°C (+50°F to +122°F)<br>-40°C to +125°C (-40°F to +257°F)<br>(Limited to Main Unit Circuitry, -20°C to +60°C unless wire leads are being used.) |
| Thermistor Temperature Range (Leaded Thermistor) X2 Sensor Only | -40°C to +125°C (-40°F to +257°F)   |
| Accuracy @ 25°C   | +/- 1% (1°C or 1.8°F)   |
| User Calibrated Accuracy  | +/- 0.25°C ( $\pm$ 0.45°F)  |
| Time Constant @ 25°C  | 30 sec  |

\* Hardware can not withstand negative voltage. Please take care when connecting a power device.

\*\* At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.

## CAUTION/NOTICE:

This product is designed for application in an ordinary environment (normal room temperature, humidity and atmospheric pressure). Do not use this sensor under the following conditions as these factors can deteriorate the product characteristics and cause failures and burn-out.

- Corrosive gas or deoxidizing gas - (chlorine gas, hydrogen sulfide gas, ammonia gas, sulfuric acid gas, nitric oxides gas, etc.).
- Volatile or flammable gas.
- Dusty conditions.
- Under low or high pressure.
- Wet or excessively humid locations.
- Places with salt water, oils, chemical liquids, or organic solvents.
- Where there are excessively strong vibrations.
- Other places where similar hazardous conditions exist.

Use this product within the specified temperature range. Higher temperature may cause deterioration of the characteristics or the material quality of this product.



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## PolarXpress XW Sensor Wireless Water Sensor

### GENERAL DESCRIPTION

The Wireless Water Sensor detects the presence or non-presence of water.

### FEATURES

- 3 ft. leaded wires.
- Immediately detects water.
- PolarXpress online wireless sensor monitoring and notification system to configure sensors, view data and set alerts via SMS text and email.

### PRINCIPLE OF OPERATION

The PolarXpress Wireless Water Sensor detects when water is present by completing the circuit between the two leaded wires. When water is present the sensor will immediately turn on the FR radio and transmit the data to the wireless gateway and PolarXpress Online Sensor Monitoring and Notification System, allowing the user to immediately receive an SMS text or email alert. The sensor can be configured to detect both the presence and non-presence of water.

### POWER OPTIONS

X Sensors are powered by a replaceable 3.0 V coin cell battery. The X2 Sensors are larger in size (3" [L] x 2.1" [W] x 1.2" [h]) and include two long-life AA batteries.

It is recommended that unless you are using the AA battery solution, you set heartbeat to no faster than one hour to preserve battery life.

### APPLICATIONS

- CRAC/CRAH Water Leak Detection
- Chilled Water Pipe Leak Detection
- Under Raised Floor Water Detection



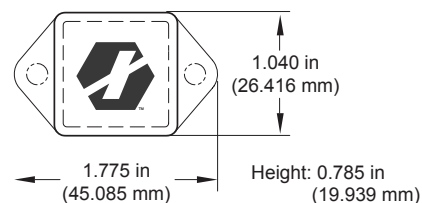
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- Power: X Sensor: replaceable 3.0 V coin cell battery.  
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- Communication: RF 900, 868 and 433 MHz
- Antenna: 4" wire antenna
- Operating Temperature: -20° to 60°C (-4° to 140°F)
- Device Range: 250 - 300 ft. non-line-of-sight\*
- Battery Life:  
X Sensor: At 1 hour heartbeat setting, coin cell battery will last 1-2 years.\*\*  
X2 Sensor: At 1 hour heartbeat setting, included AA batteries will last more than 4 years.\*\*

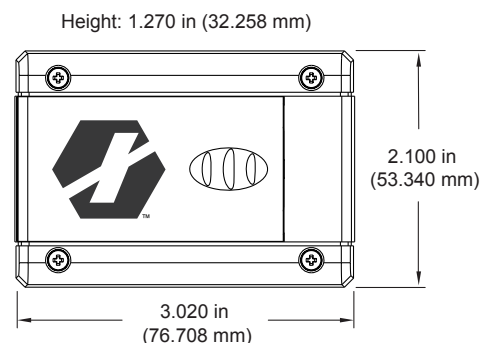
\* Actual range may vary depending on environment.

\*\* Battery life is determined by sensor reporting frequency and other variables.

X Sensor



X2 Sensor





## TECHNICAL SPECIFICATIONS

|   |   |
|---|---|
| Supply Voltage  | 2.0 - 3.6 VDC*  |
| Current Consumption                                       | 0.7 $\mu$ A (sleep mode)<br>2 mA (radio idle/off mode)<br>2 mA (measurement mode)<br>25 mA (radio RX mode)<br>35 mA (radio TX mode) |
| Operating Temperature Range (Board Circuitry and Battery) | -20°C to +60°C (-4°F to +140°F)**   |
| Optimal Battery Temperature Range (Coin Cell)             | +10°C to +50°C (+50°F to +122°F)  |
| Lead Wire Length  | 3 ft. (36 in.)  |
| Detection Wires   | High Impedance  |

\* Hardware can not withstand negative voltage. Please take care when connecting a power device.  
\*\* At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.

## CAUTION/NOTICE:

This product is designed for application in an ordinary environment (normal room temperature, humidity and atmospheric pressure). Do not use this sensor under the following conditions as these factors can deteriorate the product characteristics and cause failures and burn-out.

- Corrosive gas or deoxidizing gas - (chlorine gas, hydrogen sulfide gas, ammonia gas, sulfuric acid gas, nitric oxides gas, etc.).
- Volatile or flammable gas.
- Dusty conditions.
- Under low or high pressure.
- Wet or excessively humid locations.
- Places with salt water, oils, chemical liquids, or organic solvents.
- Where there are excessively strong vibrations.
- Other places where similar hazardous conditions exist.

Use this product within the specified temperature range. Higher temperature may cause deterioration of the characteristics or the material quality of this product.



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## PolarXpress XM Sensor

### Wireless Infrared Motion Sensor

#### GENERAL DESCRIPTION

The Wireless Motion Sensor uses an infrared sensor to accurately detect movements made by people/animals within 16.4 ft (5 m) range.

#### FEATURES

- Detect motion.
- PolarXpress online wireless sensor monitoring and notification system to configure sensors, view data and set alerts via SMS text and email.

#### PRINCIPLE OF OPERATION

The PolarXpress Wireless Infrared Motion Sensor detects motion and movement using infrared technology. When the sensor detects movement it communicates with the PolarXpress Online Sensor Monitoring and Notification System. PolarXpress stores all data in the online system where the data can be reviewed and exported as a data sheet or graph. Notifications can be set up through the online system to alert the user when motion has been detected.

#### POWER OPTIONS

X Sensors are powered by a replaceable 3.0 V coin cell battery. The X2 Sensors are larger in size (3" [L] x 2.1" [W] x 1.2" [h]) and include two long-life AA batteries.

It is recommended that unless you are using the AA battery solution, you set heartbeat to no faster than one hour to preserve battery life.

#### APPLICATIONS

- Monitor Area Access
- Detect When People Enter a Room
- Detect When People Enter Hot Aisle or Cold Aisle



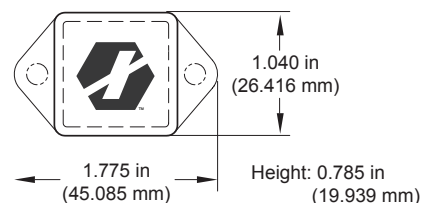
#### POLARXPRESS X SENSOR CORE SPECIFICATIONS

- Power: X Sensor: replaceable 3.0 V coin cell battery.  
X2 Sensor: 2 replaceable AA 1.5V batteries.
- Communication: RF 900, 868 and 433 MHz
- Antenna: 4" wire antenna
- Operating Temperature: -20° to 60°C (-4° to 140°F)
- Device Range: 250 - 300 ft. non-line-of-sight\*
- Battery Life:  
X Sensor: At 1 hour heartbeat setting, coin cell battery will last 3-4 months.\*\*  
X2 Sensor: At 1 hour heartbeat setting, included AA batteries will last ~ 1 year.\*\*

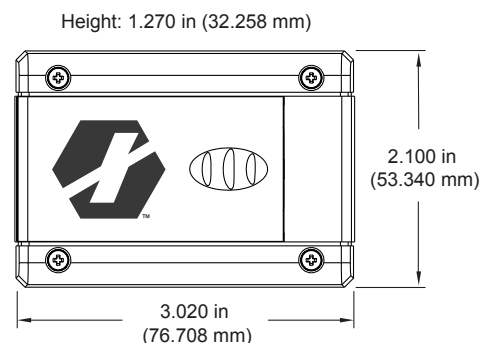
\* Actual range may vary depending on environment.

\*\* Battery life is determined by sensor reporting frequency and other variables.

X Sensor



X2 Sensor

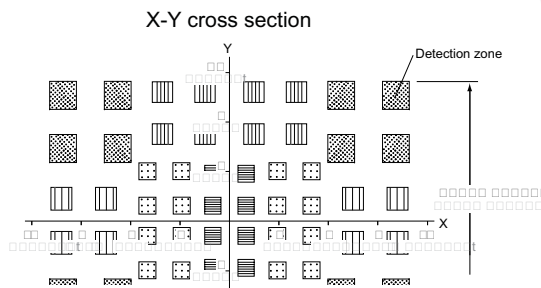
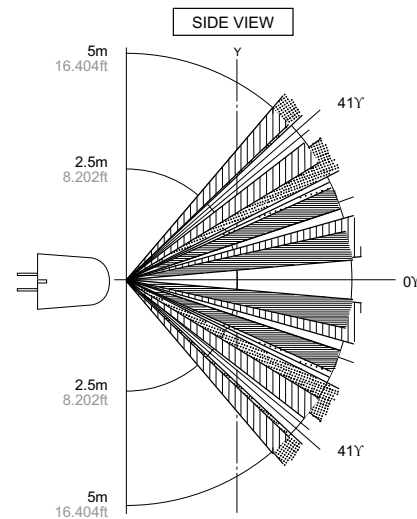
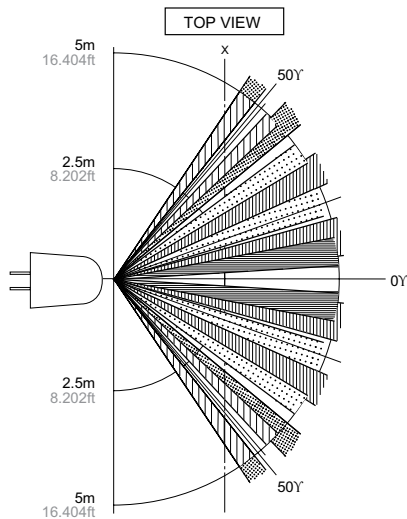


## TECHNICAL SPECIFICATIONS

|   |   |
|---|---|
| Supply Voltage  | 2.0 - 3.6 VDC*  |
| Current Consumption                                       | 0.7 $\mu$ A (sleep mode)<br>2 mA (radio idle/off mode)<br>2 mA (measurement mode)<br>25 mA (radio RX mode)<br>35 mA (radio TX mode) |
| Operating Temperature Range (Board Circuitry and Battery) | -20°C to +60°C (-4°F to +140°F)**   |
| Optimal Battery Temperature Range (Coin Cell)             | +10°C to +50°C (+50°F to +122°F)  |
| Sensor Detection Range                                    | 16.4 ft (5m)  |
| Retard Consumption Current (Standby)                      | Typ: 170 $\mu$ A<br>Max: 300 $\mu$ A  |
| Sensor Warm-up Time                                       | 30 sec  |

\* Hardware can not withstand negative voltage. Please take care when connecting a power device.

\*\* At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.



## REMARKS:

1. The X-Y cross-sectional diagram shows the detection area.
2. The differences in the detection zone patterns are indicative of the projections of the 16 lenses with single focal point and with five optical axes. An object whose temperature differs from the background temperature and which crosses inside the detection zone will be detected.

## PolarXpress XC Sensor

### Wireless 0-1 mA Current Sensor

#### GENERAL DESCRIPTION

The Wireless 0-1mA DC Current Sensor is designed to work with current transducers that convert a measured AC current signal to a DC signal up to 1mA. When a current transformer (CT) is used to obtain the measured AC signal, and connected to a current transducer, the Wireless 0-1mA DC Current Sensor will provide a signal that is proportional to the measured AC current that can be displayed.

#### FEATURES

- Measures current up to 1 mA DC.
- PolarXpress online wireless sensor monitoring and notification system to configure sensors, view data and set alerts via SMS text and email.

#### PRINCIPLE OF OPERATION

By connecting the leads of the PolarXpress Wireless 0-1mA Current Sensor to the output of a current transducer (such as a Flex-Core MCT5), and connecting appropriately sized current transformers to the input of a current transducer, the sensor will wirelessly transmit the measured AC current from system loads as a proportional 0-1mA DC signal through a PolarXpress Gateway to the PolarXpress Graphical User Interface (GUI). The sensor data is transformed back to the original current reading in the GUI and stored. When Facility and IT load currents are measured, the readings can then be attached to the PolarXpress PUE calculator to provide real-time PUE.

#### POWER OPTIONS

X Sensors are powered by a replaceable 3.0 V coin cell battery. The X2 Sensors are larger in size (3" [L] x 2.1" [W] x 1.2" [h]) and include two long-life AA batteries.

It is recommended that unless you are using the AA battery solution, you set heartbeat to no faster than one hour to preserve battery life.



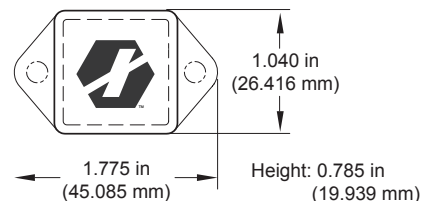
#### POLARXPRESS X SENSOR CORE SPECIFICATIONS

- Power: X Sensor: replaceable 3.0 V coin cell battery.  
X2 Sensor: 2 replaceable AA 1.5V batteries.
- Communication: RF 900, 868 and 433 MHz
- Antenna: 4" wire antenna
- Operating Temperature: -7° to 60°C (20° to 140°F)
- Device Range: 250 - 300 ft. non-line-of-sight\*
- Battery Life:  
X Sensor: At 1 hour heartbeat setting, coin cell battery will last 1-2 years.\*\*  
X2 Sensor: At 1 hour heartbeat setting, included AA batteries will last more than 4 years.\*\*

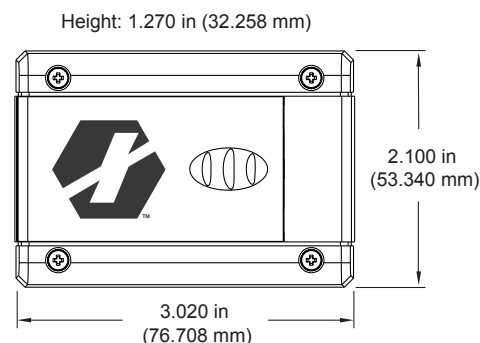
\* Actual range may vary depending on environment.

\*\* Battery life is determined by sensor reporting frequency and other variables.

X Sensor



X2 Sensor





## TECHNICAL SPECIFICATIONS

|   |   |
|---|---|
| Supply Voltage  | 2.0 - 3.6 VDC*  |
| Current Consumption   | 0.7 $\mu$ A (sleep mode)<br>2 mA (radio idle/off mode)<br>2 mA (measurement mode)<br>25 mA (radio RX mode)<br>35 mA (radio TX mode) |
| Operating Temperature Range (Board Circuitry and Coin Cell) | -7°C to +60°C (20°F to +140°F)**  |
| Optimal Battery Temperature Range (Coin Cell)               | +10°C to +50°C (+50°F to +122°F)  |
| Sensor Resolution   | 11-bit single ended   |
| 0-1 mA Input  | ~0.5 $\mu$ A  |
| 0-5 Amp Input   | ~ 2.5 mA  |
| 200 Amp CT Input  | ~ 10 mA   |
| Conversion Time   | 228 $\mu$ s   |
| Full Scale Current  | 0-1 mA ***  |
| Input Resistance  | 1.2 kohms   |

\* Hardware can not withstand negative voltage. Please take care when connecting a power device.

\*\* At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.

\*\*\* If application exceeds 1 mA the sensor will return a maximum reading of 1 mA.

If current applied to measurement port exceeds 2 mA, circuit protection and conditioning is required.

## CAUTION/NOTICE:

This product is designed for application in an ordinary environment (normal room temperature, humidity and atmospheric pressure). Do not use this sensor under the following conditions as these factors can deteriorate the product characteristics and cause failures and burn-out.

- Corrosive gas or deoxidizing gas - (chlorine gas, hydrogen sulfide gas, ammonia gas, sulfuric acid gas, nitric oxides gas, etc.).
- Volatile or flammable gas.
- Dusty conditions.
- Under low or high pressure.
- Wet or excessively humid locations.
- Places with salt water, oils, chemical liquids, or organic solvents.
- Where there are excessively strong vibrations.
- Other places where similar hazardous conditions exist.

Use this product within the specified temperature range. Higher temperature may cause deterioration of the characteristics or the material quality of this product.



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## PolarXpress XL Sensor Wireless Light Sensor

### GENERAL DESCRIPTION

The Wireless Light Sensor detects the presence of light.

### FEATURES

- Detects presence of light.
- PolarXpress online wireless sensor monitoring and notification system to configure sensors, view data and set alerts via SMS text and email.

### PRINCIPLE OF OPERATION

The Wireless Light Sensor uses a photo resistor to detect the presence of light around the device. The sensor returns a value of light or no-light to the PolarXpress Online Sensor Monitoring and Notification System. The data is stored in the online system and can be reviewed and exported as a data sheet or graph. Notifications can be set up through the online system to alert the user when light is present or not with the ability to only notify within the time of day parameters.

### POWER OPTIONS

X Sensors are powered by a replaceable 3.0 V coin cell battery. The X2 Sensors are larger in size (3" [L] x 2.1" [W] x 1.2" [h]) and include two long-life AA batteries.

It is recommended that unless you are using the AA battery solution, you set heartbeat to no faster than one hour to preserve battery life.

### APPLICATIONS

- Data Center Lighting on/off
- Server Row Lighting on/off



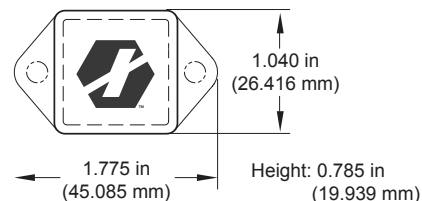
### POLARXPRESS X SENSOR CORE SPECIFICATIONS

- Power: X Sensor: replaceable 3.0 V coin cell battery.  
X2 Sensor: 2 replaceable AA 1.5V batteries.
- Communication: RF 900, 868 and 433 MHz
- Antenna: 4" wire antenna
- Operating Temperature: -7° to 60°C (20° to 140°F)
- Device Range: 250 - 300 ft. non-line-of-sight\*
- Battery Life:  
X Sensor: At 1 hour heartbeat setting, coin cell battery will last 1-2 years.\*\*  
X2 Sensor: At 1 hour heartbeat setting, included AA batteries will last more than 4 years.\*\*

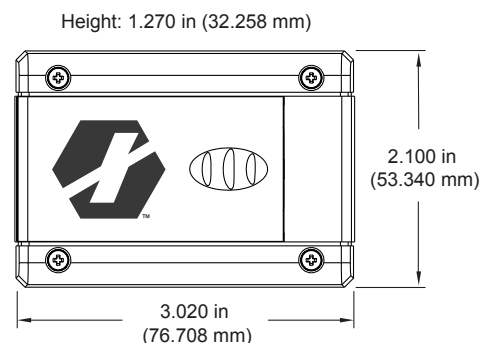
\* Actual range may vary depending on environment.

\*\* Battery life is determined by sensor reporting frequency and other variables.

X Sensor



X2 Sensor



## TECHNICAL SPECIFICATIONS

|   |   |
|---|---|
| Supply Voltage  | 2.0 - 3.6 VDC*  |
| Current Consumption                                       | 0.7 $\mu$ A (sleep mode)<br>2 mA (radio idle/off mode)<br>2 mA (measurement mode)<br>25 mA (radio RX mode)<br>35 mA (radio TX mode) |
| Operating Temperature Range (Board Circuitry and Battery) | -7°C to +60°C (-4°F to +140°F)**  |
| Optimal Battery Temperature Range (Coin Cell)             | +10°C to +50°C (+50°F to +122°F)  |
| Angle of Half Sensitivity                                 | $\phi = \pm 50^\circ$   |
| Max Light Level   | 0 - 1,000 Lux   |

\* Hardware can not withstand negative voltage. Please take care when connecting a power device.

\*\* At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory.

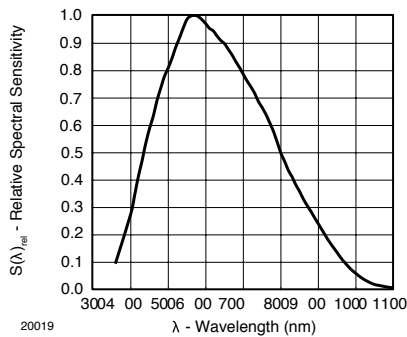


Fig. 1 - Relative Spectral Sensitivity vs. Wavelength

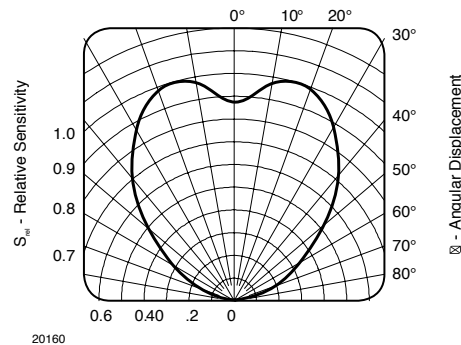


Fig. 2 - Relative Radiant Sensitivity vs. Angular Displacement

## CAUTION/NOTICE:

This product is designed for application in an ordinary environment (normal room temperature, humidity and atmospheric pressure). Do not use this sensor under the following conditions as these factors can deteriorate the product characteristics and cause failures and burn-out.

- Corrosive gas or deoxidizing gas - (chlorine gas, hydrogen sulfide gas, ammonia gas, sulfuric acid gas, nitric oxides gas, etc.).
- Volatile or flammable gas.
- Dusty conditions.
- Under low or high pressure.
- Wet or excessively humid locations.
- Places with salt water, oils, chemical liquids, or organic solvents.
- Where there are excessively strong vibrations.
- Other places where similar hazardous conditions exist.

Use this product within the specified temperature range. Higher temperature may cause deterioration of the characteristics or the material quality of this product.



## PolarXpress XO Sensor

### Wireless Open/Closed Sensor

#### GENERAL DESCRIPTION

The Wireless Open/Closed Sensor can be used to detect when a door or window is opened and closed using a magnetic switch.

#### FEATURES

- Detects when a door or window is accessed.
- Magnet is included.
- PolarXpress online wireless sensor monitoring and notification system to configure sensors, view data and set alerts via SMS text and email.

#### PRINCIPLE OF OPERATION

The PolarXpress Wireless Open/Closed Sensor uses an external magnetic switch to detect the presence or removal of a trigger magnet. When the sensor detects that the magnet is removed or returned it sends the information to the PolarXpress Online Sensor Monitoring and Notification System. The data is stored in the online system and can be reviewed and exported as a data sheet or graph. Notifications can be set up through the online system to alert the user when a magnetic source is present or not with the ability to only notify within time of day parameters.

#### POWER OPTIONS

X Sensors are powered by a replaceable 3.0 V coin cell battery. The X2 Sensors are larger in size (3" [L] x 2.1" [W] x 1.2" [h]) and include two long-life AA batteries.

It is recommended that unless you are using the AA battery solution, you set heartbeat to no faster than one hour to preserve battery life.

#### APPLICATIONS

- Containment Doors
- Cabinet Doors
- Room Entry Doors



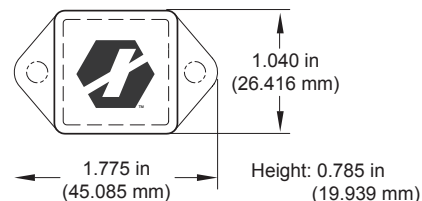
#### POLARXPRESS X SENSOR CORE SPECIFICATIONS

- Power: X Sensor: replaceable 3.0 V coin cell battery.  
X2 Sensor: 2 replaceable AA 1.5V batteries.
- Communication: RF 900, 868 and 433 MHz
- Antenna: 4" wire antenna
- Operating Temperature: -20° to 60°C (-4° to 140°F)
- Device Range: 250 - 300 ft. non-line-of-sight\*
- Battery Life:  
X Sensor: At 1 hour heartbeat setting, coin cell battery will last 1-2 years.\*\*  
X2 Sensor: At 1 hour heartbeat setting, included AA batteries will last more than 4 years.\*\*

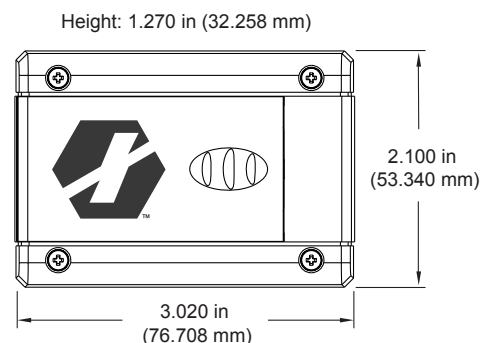
\* Actual range may vary depending on environment.

\*\* Battery life is determined by sensor reporting frequency and other variables.

X Sensor



X2 Sensor





## TECHNICAL SPECIFICATIONS - ELECTRONICS

|   |   |
|---|---|
| Supply Voltage (Battery Power)  | 2.0 - 3.6 VDC*  |
| Current Consumption   | 0.7 $\mu$ A (sleep mode)<br>2 mA (radio idle/off mode)<br>2 mA (measurement mode)<br>25 mA (radio RX mode)<br>35 mA (radio TX mode) |
| Operating Temperature Range (Board Circuitry and Battery)   | -20°C to +60°C (-4°F to +140°F)**   |
| Optimal Battery Temperature Range (Coin Cell)   | +10°C to +50°C (+50°F to +122°F)  |
| * Hardware can not withstand negative voltage. Please take care when connecting a power device.   |   |
| ** At temperatures above 100°C, it is possible for the board circuitry to lose programmed memory. |   |

## TECHNICAL SPECIFICATIONS - MAGNETIC SWITCH

|                          |  |
|--------------------------|--|
| Switch Cycles            | 50 million   |
| Operation Gap            | up to 3/4 inch   |
| Wire Leads               | 22 gauge / 15 inch length  |
| Magnet                   | Alnico   |
| Magnet Case Construction | Weatherproof, high-impact ABS plastic with self-adhesive backing |
| Magnet Temperature Range | -25°C to +70°C (-15°F to +160°)                                  |

### CAUTION/NOTICE:

This product is designed for application in an ordinary environment (normal room temperature, humidity and atmospheric pressure). Do not use this sensor under the following conditions as these factors can deteriorate the product characteristics and cause failures and burn-out.

- Corrosive gas or deoxidizing gas - (chlorine gas, hydrogen sulfide gas, ammonia gas, sulfuric acid gas, nitric oxides gas, etc.).
- Volatile or flammable gas.
- Dusty conditions.
- Under low or high pressure.
- Wet or excessively humid locations.
- Places with salt water, oils, chemical liquids, or organic solvents.
- Where there are excessively strong vibrations.
- Other places where similar hazardous conditions exist.

Use this product within the specified temperature range. Higher temperature may cause deterioration of the characteristics or the material quality of this product.



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